

## CLAIMS:

1. A fuel cell comprising: an anode compartment including an anode and a metal fuel; a cathode compartment including a cathode; and disposed within said anode compartment, within said cathode compartment, or between said anode compartment and said cathode compartment, at least one biocompatible membrane that is impervious to the passage of metals and metal ions having at least one layer of a synthetic polymer material which includes an anode side and a cathode side and at least one polypeptide associated therewith, said polypeptide capable of participating in a chemical reaction, participating in the transporting of protons from said anode side of said at least one layer to said cathode side of said at least one layer, or participating in the formation of molecular structures that facilitate such reactions or transport.
2. The fuel cell of claim 1 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 10 milliwatts/cm<sup>2</sup> are generated.
3. The fuel cell of claim 2 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 50 milliwatts/cm<sup>2</sup> are generated.
4. The fuel cell of claim 3 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 100 milliwatts/cm<sup>2</sup> are generated.
5. The fuel cell of claim 1 wherein, said anode is made of metal.
6. The fuel cell of claim 5 wherein, said anode is said metal fuel.
7. The fuel cell of claim 1 wherein, said polypeptide is capable of participating in transporting protons from one side of said anode side of said biocompatible membrane to said cathode side of said biocompatible membrane.

8. The fuel cell of claim 1, wherein said at least one biocompatible membrane is disposed between said anode and said cathode.

9. The fuel cell of claim 1, further comprising: a dielectric material disposed between said anode and said cathode that will permit the flow of protons from said anode compartment to said cathode compartment.

10. A fuel cell comprising: an anode compartment including a metal anode which serves as fuel; a cathode compartment including a cathode; and disposed within said anode compartment, within said cathode compartment, or between said anode compartment and said cathode compartment, at least one biocompatible membrane that is impervious to the passage of metals and metal ions having at least one layer of a synthetic polymer material which includes an anode side and a cathode side and at least one polypeptide associated therewith, said polypeptide capable of participating in the transporting of protons from said anode side of said at least one layer to said cathode side of said at least one layer and wherein said synthetic polymer material consists of at least one block copolymer and optionally at least one additive.

11. The fuel cell of claim 10 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 10 milliwatts/cm<sup>2</sup> are generated.

12. The fuel cell of claim 11 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 50 milliwatts/cm<sup>2</sup> are generated.

13. The fuel cell of claim 2 wherein, when said anode and said cathode are placed into electrical contact though a circuit, 100 milliwatts/cm<sup>2</sup> are generated.